

Irrigating Cucumbers

FOR SOUTHWESTERN ONTARIO

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It is easy to say that crops grow and yield best when they have a continuous supply of water, but how do you make sure that they get it? And how does this apply to cucumbers grown in southwestern Ontario? The answers depend on several conditions:

- Cucumbers for the slicing trade are often grown on sandy loam soils in this region.
- Soils with plenty of organic matter store more water that is available to plants than soils with little organic matter.
- Fine sandy loams, such as Tuscola soils, store more available water than sandy loams like Fox (Table 1).
- The soil into which roots penetrate acts as a reservoir for moisture that plants use between rains or irrigations.
- Sprinkler irrigation ensures that the soil always contains some water that the crop can use. But proper irrigation depends on your knowing when the crop has used up the moisture in the soil, and how much water will refill the reservoir. The crop and the type of soil affect the rate and frequency of irrigation, because the roots of different crops penetrate to different depths.

EFFECT ON CUCUMBERS

One way to measure the available moisture in the soil is to bury a gypsum block in it and take readings on a Bouyoucos meter (Figure 1). This was tried at the Harrow station with irrigation on Fox sandy loam, a soil that is often used for growing cucumbers. It does not hold moisture well and the crops on it should respond more to irrigation than on soils that can store more water. Water was applied when the meter registered 75, 50, 25 and 0 percent available moisture at six inches depth.

The experiments showed that cucumber yields dropped when available

Table 1 – Available Moisture That May Be Stored in the Top Foot of Soil

Soil type	Moisture inches
Fox sandy loam	1.4
Harrow sandy loam	1.6
Berrien sandy loam	1.7
Tuscola fine sandy loam	2.0

moisture was allowed to go below 25 percent before irrigation (Table 2). In six years of tests, only 1959 and 1961 were dry enough to warrant the irrigation of cucumbers, but yields were almost doubled in those two years if we irrigated when the available moisture was 25 percent.

In the same tests, the available moisture meter indicated when we should irrigate and how much water was needed. Irrigation should continue until the meter shows nearly 100 percent available moisture.

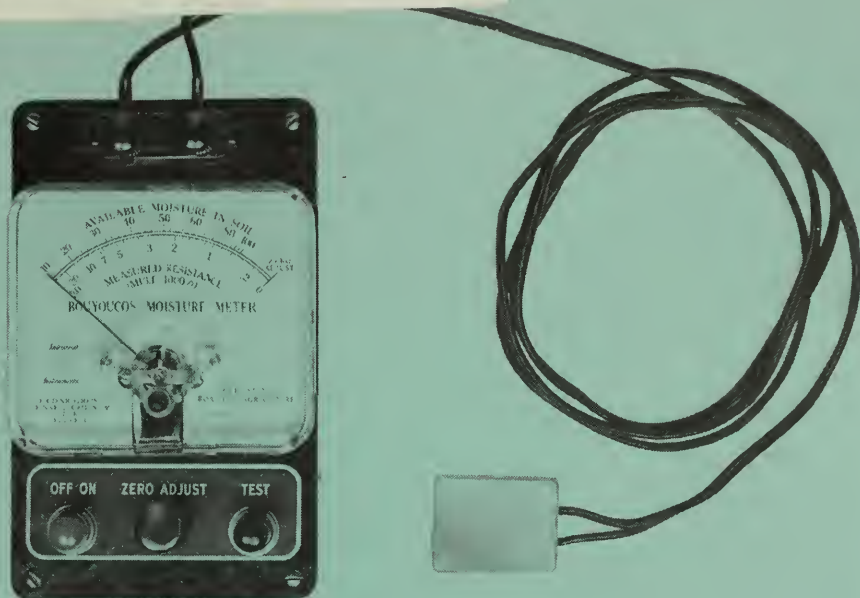
HOW TO IRRIGATE

The moisture stored in the soil in winter and spring is usually enough for cucumber transplants from the time they are set out in early May until the waxed paper covers are removed when the frost danger is past. But in June, when the plants grow rapidly, and up to the third week of the harvest, about July 20, the rainfall may not be enough or properly distributed for maximum yields. This is when the cucumbers may need to be irrigated.

Table 2 – Yields of Cucumbers after Irrigation at Various Moisture Levels

Available soil moisture percent	Hundredweight per acre					
	1956	'57	'58	'59	'60	'61
No irrigation	147	268	323	184	246	195
0	-	-	-	-	215	306
25	164	209	320	336	262	380
50	184	257	348	354	274	380
75	186	248	359	366	-	-

Figure 1. This equipment for measuring available moisture in the soil consists of a gypsum block connected to a meter.



To apply the right amount of water at the right time, you need to know three things: how fast the crop uses water, how much moisture can be taken from the soil before the crop suffers, and what the rainfall has been. Only the rainfall is easily measured. But at the Harrow station we were able to calculate the average rate of water use in June and early July. The experiments also showed how much water could be taken from Fox sandy loam before the cucumbers suffered, and we recorded the times and amounts of irrigation and rainfall.

When the available moisture was 75 percent (on the meter), the crop needed frequent but light irrigation; at 25 percent or 0, it needed few applications but in larger amounts. In practice, keep to the fewest applications that will produce the best yield.

In 1959 and 1961, the yields were highest with irrigation at the rate of 0.12 inches a day and an average of 11 days between applications. In the other four years, when irrigation made no difference, the average rainfall was more than 0.12 inches a day from June 1 to July 20.

Probably more than 0.12 inches of water is needed on a hot day and less on a cool day. The most effective way to irrigate is to use equipment that measures soil moisture, or some other method of estimating the use of water. But you can also irrigate on a simple schedule from June 1 to July 20 (Table 3) and have good crops of cucumbers, even though you may apply a little too much water in cool weather and not enough when it's hot. Reduce the irrigation if there is rain.

The Harrow, Berrien and Tuscola soil types store more water than Fox

sandy loam does, and so they need less irrigation. Low areas of Berrien sandy loam hold more water than some of the higher areas of the same soil type: irrigate these low areas according to the schedule for Tuscola fine sandy loam.

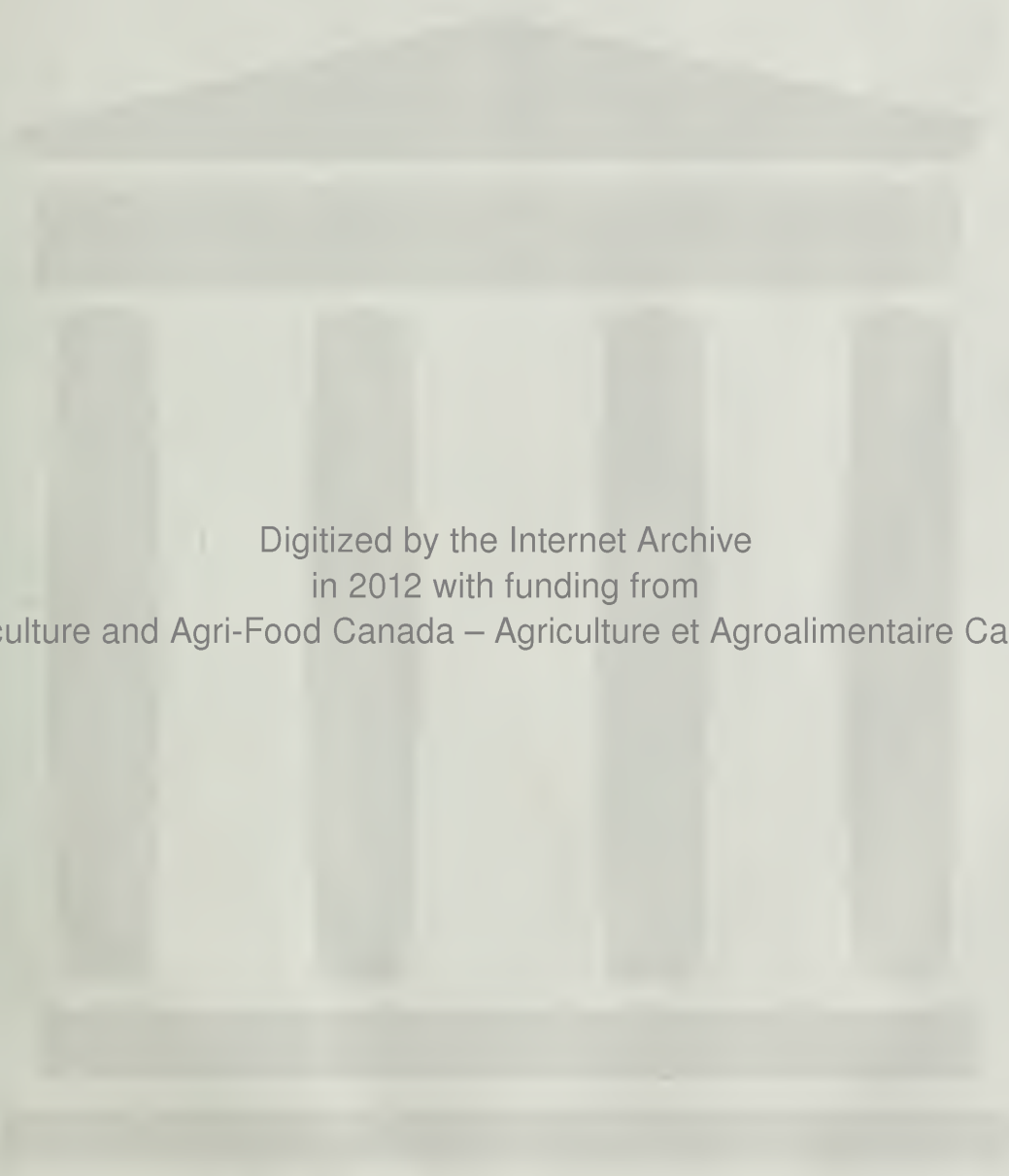
Table 3 – Irrigation Schedules for Various Soils

Soil type	Inches of water	Days between applications
Fox sandy loam	1 1/3	11
Harrow sandy loam	1 1/2	13
Berrien sandy loam	1 1/2	13
Tuscola fine sandy loam	1 3/4	15

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